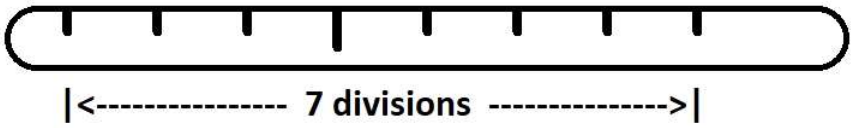
Arizona Lunar Solar Calendar

A calendar of solar shadows aligns to Arizona petroglyphs.

The declination angle of the sun creates solar calendar shadow geometry, notably the noon elevation angle of the sun, and the position of the sun on the horizon at sunrise and sunset.

Horizon Ruler



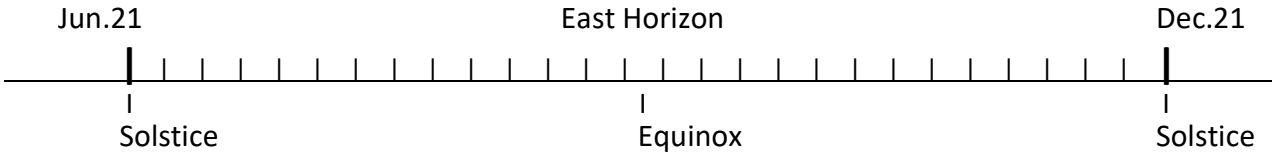
1 ruler division = 1.72 - 1.74 degrees declination.

Calendar positions on the horizon are measured from solstices:

0.5 division = 15 days to winter solstice. 16 days to summer solstice.
1 division = 21 days to winter solstice. 1 year in the 18.6-year moon cycle.
2 divisions = 30 days to winter solstice. 32 days to summer solstice.
3 divisions = lunar standstill (5.16 degrees declination)
4 divisions = solar cross quarter (6.88 degrees declination)
7 divisions = 60 days to winter solstice. 63 days to summer solstice.

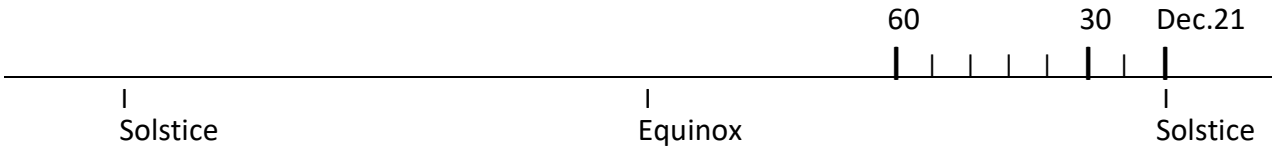
Horizon Ruler: Sunrise Calendar

Sunrises define the solar year in 27 equal divisions from solstice to solstice:

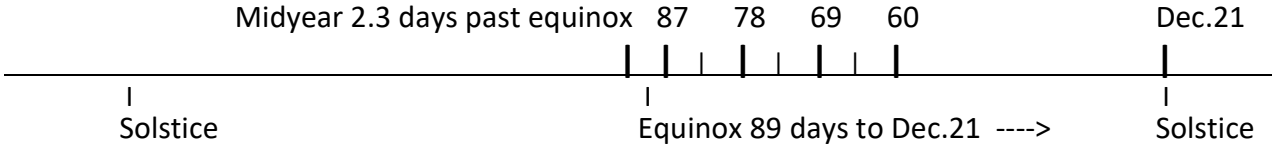


Many of these divisions have meaning, and a precise solar calendar can be remembered.

Measuring from the Dec.21 solstice:
1 division = 21 days
2 divisions = 30 days
3 divisions = minor lunar standstill (37 days)
4 divisions = solar cross quarter (43.5 days)
7 divisions = 60 days

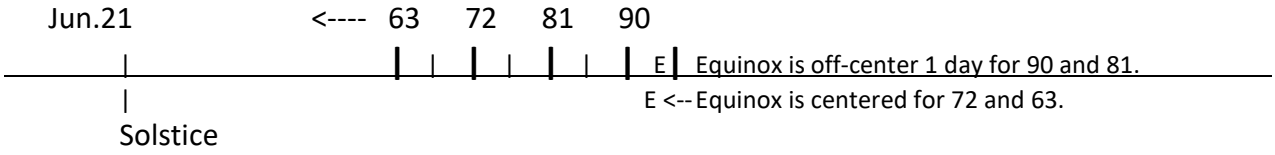


The next 7 divisions measures to equinox and midyear:

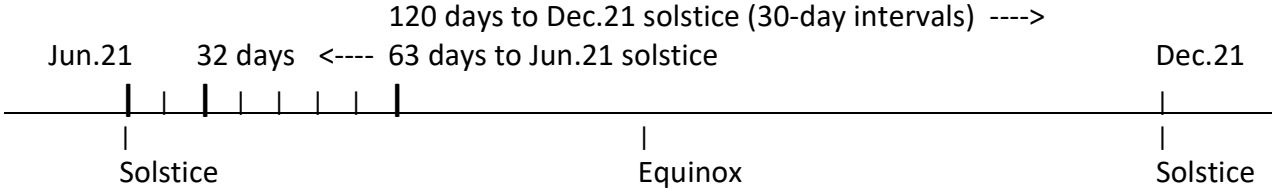


Midyear is 91.3 days to both solstices, 14 divisions to Dec.21 solstice.
Near equinox, each division is about 4.5 days (2 divisions = 9 days).

Then 9-day intervals are measured towards the Jun.21 solstice:

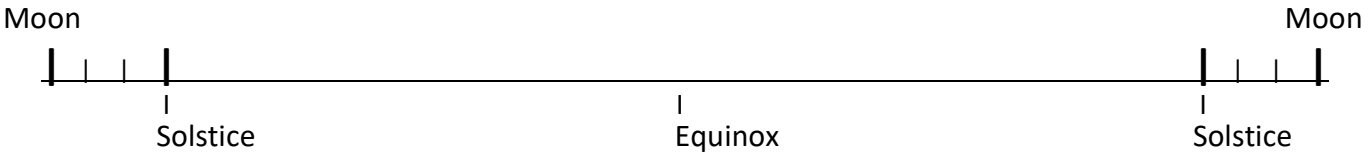


30-day intervals slow down to 31 and 32 days near the Jun.21 solstice:



Horizon Ruler: 18.6-Year Moon Cycle

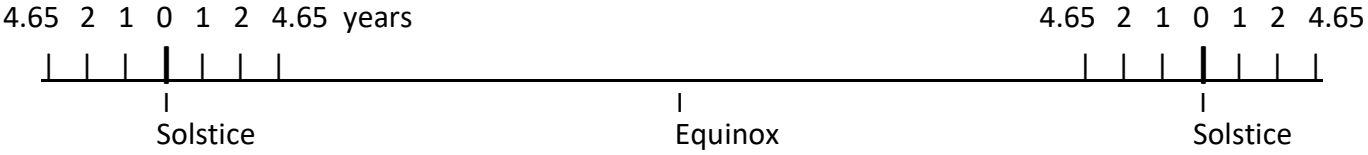
Major lunar standstill is 3 divisions beyond solstice:



The full moon is observed near Dec.21 and Jun.21.

The moon's position on the horizon moves in a cycle of 18.6 years.

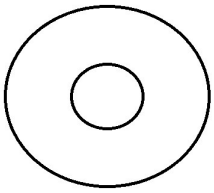
The 9.3 years from major standstill to minor standstill is centered on solstices:



Positions on the horizon are measured from solstices:
1 division from solstice equals 1 year, 2 years is 2 divisions.
3 years is 2.5 divisions, and 4.65 years is 3 divisions from solstice.

Circle geometry teaches the relationship between years and position on the horizon.

Moon astronomy is symbolized by 2 circles of 1:3 radius ratio:

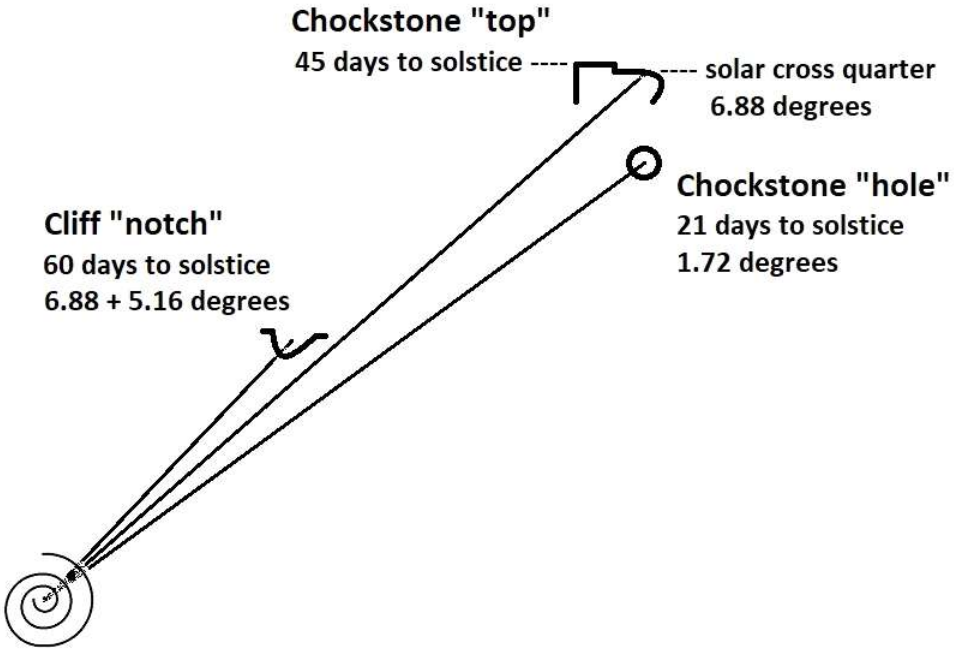


The inner circle represents 1 year and the fundamental declination angle 1.72 - 1.74 degrees.
The outer circle represents major and minor standstills at declination 5.16 - 5.22 degrees.

Geometry of 3 Noon Gnomons

Solar noon elevation angle is measured from winter solstice to equinox.
Shadows align to multiples of 1.72 degrees, 3 days, and 9 days.

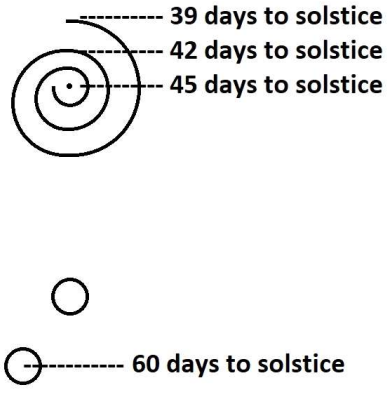
3 gnomons separated by 5.16 degrees cast noon shadows to the center of a spiral:



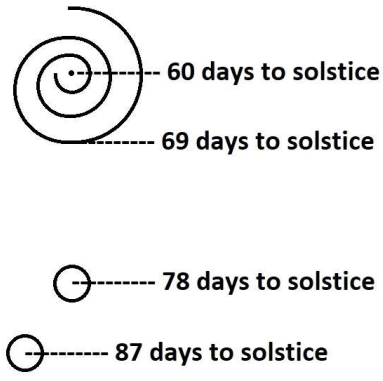
Each gnomon marks calendar days using spiral rings and nearby glyphs:

Chockstone "hole" gnomon:

Chockstone "top" gnomon:

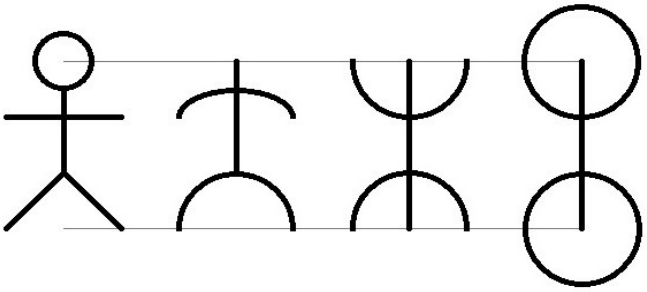


Cliff "notch" gnomon:



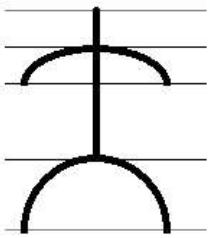
Calendar Geometry in Human Figures

Simple human figures are astronomy circles:

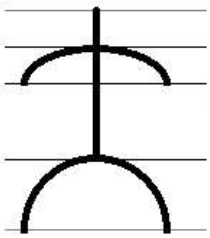


Calendar shadows align to the head, hands circle, and feet circle.
Sometimes diagonal shadows align separately to each hand, foot, shoulder, hip.

Human figures are often 5.16 degrees solar declination from head to foot:

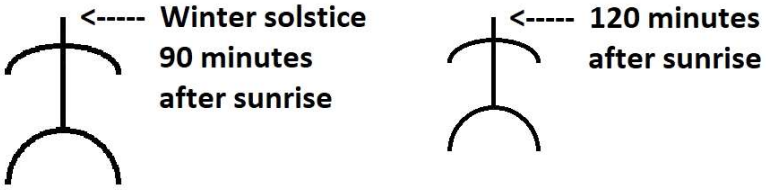


Winter Solstice	**Dec.21**	
15 days to solstice	**Jan.05**	**Dec.06**
21 days to solstice	**Jan.11**	**Nov.30**
30 days to solstice	**Jan.20**	**Nov.21**
37 days to solstice	**Jan.27**	**Nov.14**



Solar cross quarter	**May.06**	**Aug.06**
Minor lunar standstill	**May.12-13**	**Jul.30-31**
30 days to solstice	**May.22**	**Jul.21**
21 days to solstice	**May.31**	**Jul.12**

Rotation of the Earth from sunrise to sunset produces solar time angles roughly perpendicular to the calendar declination angles. At solstices, 6.88 degrees equals 30 minutes:



Synchronized shadows begin at sunrise. 6.88 degrees is the typical time interval.